European Space Agency Category 1 LBR Proposal

1. Inter-comparison of MODIS land products with MERIS data acquired by ENVISAT for selected EOS Land Validation Core Sites

2. Application domains and Location

   Themes/Sub-themes

   Land environment
   - Biophysical parameters

   Renewable resources
   - Vegetation condition
   - Land cover
   - Forestry

   Methods
   - Data access and delivery services
   - Data subsetting and reprojection
   - File format conversion

   Location

   Boreas (northern study area) –
   Center Lat./Lon: 55.8795 degrees, -98.4808 degrees
   Biome: Needleleaf Forest

   Harvard Forest –
   Center Lat./Lon: 42.5382 degrees, -72.1714 degrees
   Biome: Broadleaf Forest

   Barton Bendish, East Anglia
   Center Lat./Lon: 52.617556 degrees, 0.524444 degrees
   Biome: Broadleaf Cropland

   Mongu, Zambia
   Center Lat./Lon: -15.4379 degrees, 23.2527 degrees
   Biome: Shrubland/Woodland

   Uardry, Australia
   Center Lat./Lon: -34.39 degrees, 145.3 degrees
   Biome: Grassland/Cereal Crop

3. Principal Investigator information

   Mr. John Dwyer
   Project Scientist, Land Processes DAAC
   Science Applications International Corporation
   USGS EROS Data Center

Sioux Falls, SD 57198
Voice: 605 594-6060
FAX: 605 594-6567
Email: dwyer@usgs.gov
http://edcdaac.usgs.gov

4. Authority

Mr. Tom Kavelage
Manager, Land Processes DAAC
U.S. Geological Survey
EROS Data Center
Sioux Falls, SD 57198
Voice: 605 594-6556
FAX: 605 594-6567
Email: kalvelage@usgs.gov
http://edcdaac.usgs.gov

5. Co-Investigators

Dr. Jeffrey Morisette
Physical Scientist
NASA
Laboratory for Terrestrial Physics
Code 920
Goddard Space Flight Center
Greenbelt MD, 20771
Voice: 301-614-6676
FAX: 301-614-6695
Email: jeff.morisette@gsfc.nasa.gov

6. Executive summary

The objective of this investigation is to enable scientists to conduct comparative analyses of geophysical and biophysical information derived from remotely sensed data with in situ measurements collected over the network of EOS Land Product Validation (http://modis-land.gsfc.nasa.gov/val/) and Validation of Land European Remote Sensing Instruments (http://147.100.0.5/valeri//) study sites. This activity has been recommended by the Committee on Earth Observing Satellites (CEOS) Working Groups on Calibration and Validation (WGCV) and Information Systems and Services (WGISS). The scientific rationale for this project is predicated on improving international and interdisciplinary collaboration in the assessment, application, and improvement of remotely sensed data products and services available to the research community.

In support of NASA Earth Observing System (EOS) Land Product Validation investigations numerous remotely sensed data and field measurements are being collection at core validation sites around the world. These ‘core sites’

represent different biomes and include locations at which in situ measurements are routinely collected and instrumented flux towers are in operation. The types of remotely sensed data that are being acquired and analyzed over these sites include Landsat 7 ETM+, ASTER, MODIS, and SPOT VEGETATION. The data being collected over these sites are being used to monitor ecosystem status, compile time-series records of biophysical and geophysical parameters, and to validate the suite of land products being derived from Terra MODIS data, and eventually Aqua MODIS data.

Efforts to validate remotely sensed data products at a global scale are unprecedented, yet such efforts are necessary in order to quantify the errors or uncertainties associated with these derived geophysical and biophysical parameters. Furthermore, these products must be evaluated over a wide range of land surface conditions and on a regular basis. For validation activities to be successful, there is a substantial investment that must be made in infrastructure, instrumentation, fieldwork logistics, and collaboration. This proposal seeks to leverage existing capabilities developed for the EOS Land Validation and make these resources available to a broader community of international scientists. The objective is to expand and enhance international collaboration in areas of topical research involving the development, analysis, and application of common biophysical parameters derived from different satellite remotely sensed data.

In order to facilitate easy access to the remotely sensed data being collected over these core sites, the data are stored online under FTP directories established by the Land Processes Distributed Active Archive Center (LP DAAC) at the USGS EROS Data Center. Access to in situ measurements and data collected through field campaigns is being coordinated by the Oak Ridge National Laboratory Distributed Active Archive Center (ORNL DAAC) through the Mercury system, which is a web-based search engine (http://mercury.ornl.gov/ornldaac/). Access to many of the remotely sensed and in situ data sets collected over the EOS Land Validation 'core sites' can be accessed through Mercury or the MODIS Land Validation web page (http://modarch.gsfc.nasa.gov/MODIS/LAND/VAL/).

The CEOS WGISS Test Facility (WTF) is a collaborative activity with the CEOS WGCV that is intended to build upon the infrastructure developed for the EOS Land Product Validation program with the intention of providing enhanced data access and delivery services. In addition, we are hoping to stimulate interest and participation by the Validation of Land European Remote Sensing Instruments (VALERI, http://147.100.0.5/valeri//) to extend the network and diversity of sites as well as increase collaborative research. The WTF is a web portal that enables investigators to select a particular site of interest, determine what data are available for that site, and select datasets for ftp download. Certain services may be requested to be applied to the data prior to download, including: spatial and parameter subsetting, projection transformation, and file format conversion.

We anticipate that these types of services will enhance the ease of use of data products, i.e. the data will be more easily assimilated into commonly used software analysis tools. By offering diverse data products that can be retrieved in a more usable form, investigators will spend less time on data preparation and more time on data analysis and product inter-comparison. The WTF currently

offers these services applied to MODIS land and SPOT Vegetation NDVI products, and the plan is to provide similar services to the MERIS data that we acquire through this proposal.

Products Requested

MERIS
Level 1B Full Resolution (MER_FR__1P)
Level 2 Full Resolution (MER_FR__2P)
Level 2 Reduced Resolution Vegetation indices (MER_RRV_2P)

7. Schedule

May 1, 2003
- submit detailed product requests

June 1, 2003
- receive MERIS data products
- begin development of software tools for reading and reformatting science data and metadata files
- begin development of software tools to read geolocation information

July 1 - August 1, 2003
- modify subsetting, projection, and format conversion software to handle MERIS data
- perform integration and test of subsetting, projection, and format conversion software with WTF interface
- begin populating validation site FTP directories with MERIS data

September 1, 2003
- MERIS data available through Phase I of WGISS Test Facility